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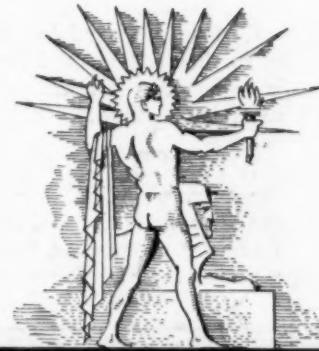
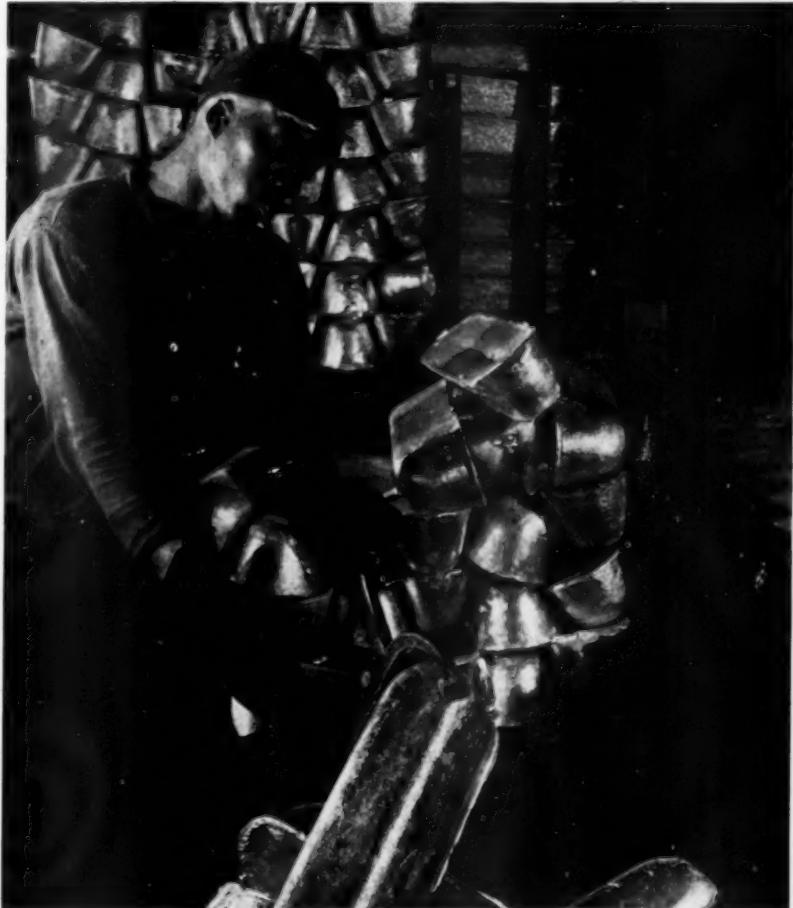
SCIENCE NEWS LETTER

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SEP 11 1940

DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



September 7, 1940

Chiaroscuro

See Page 152

A SCIENCE SERVICE PUBLICATION

Do You Know?

Italy has three companies producing synthetic rubber.

Seaplanes help Iceland's fishermen to locate herring shoals from the air.

The average American motor vehicle used 724 gallons of gasoline last year.

The United States has in reserve medical stores of opium sufficient for three years' use.

A Japanese patent claims discovery of an aluminum alloy hard enough to be worked into sword blades.

One farmer who has kept daily farm records for 50 years says that his book-keeping takes only 38 hours a year.

"People don't die of tuberculosis in this day and age; they die of neglect," says Dr. Louis I. Dublin, noted statistician.

Germany is planting quantities of wild roses—not for decorative purposes, but because the hips are reported rich in Vitamin C.

Cotton yarn used in airplane fabrics, typewriter ribbons and fine dress goods is so fine that it takes 50 miles of yarn to make a pound.

A Danish custom since 1853 has been the mass migration of country children to cities and city children to private farms for vacations at little cost, a project supervised by Denmark's teachers.

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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How does a rat act in a dilemma? p. 158.

PUBLIC HEALTH

What hitherto unsuspected danger lurks in swimming pools? p. 153.

Of Argentina's 13,000,000 people almost one-third live in Buenos Aires and suburbs.

A Florida industrial plant is producing grapefruit seed oil, found useful in textile dyeing.

There are 187 known species of oysters, some of them native to only one spot in the world.

The first blood transfusion in human beings was performed successfully in 1667, transferring sheep's blood to man.

Cranberry skins are found to yield ursolic acid, useful in making oil and water mix.

Sand free from iron and suitable for making Christmas tree ornaments is reported available in Puerto Rico.

In some National Parks, ranger naturalists lead camera trips, guiding picture fans to good shooting spots.

A ten-foot rake dragged by a caterpillar tractor has been devised for cleaning debris from one of California's beaches.

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METEOROLOGY

Five-Day Forecasts Launched By U. S. Weather Bureau

Issued Twice Each Week, They Will Enable People To Plan Ahead for Business, Farming, Pleasure

YOUR daily newspaper, and perhaps your breakfast-time radio, are now bringing you U. S. Weather Bureau announcements that go something like this:

"Temperature markedly below normal at beginning of period, recovering to near normal by end, possibly to above normal in western part of district. Rainfall slight in northern sections, but rain indicated at start of period in western portion. Subnormal totals indicated throughout district."

In such prosaic and unexciting language is the newest science-born revolution proclaimed to the world; for this is a sample five-day forecast, such as have just begun to be made twice a week from the ten cities that are designated as district headquarters by the Weather Bureau.

Many Benefits Foreseen

Thousandsfold benefits can readily be seen as resulting from a five-day look ahead at what the weather's going to be. If you read a forecast like that on a Wednesday, you can guess that Jimmy, the office boy, will be wanting to go to his grandmother's funeral again on Friday afternoon, when there's a double-header. And you can plan to shoot a little golf on Saturday, yourself. And your wife will phone the cleaners to be sure to get your light suit back in time to wear on Sunday—it's going to be warmer.

Or if you are a farmer, you can decide to haul that load of hogs to town today, when it's cool and may possibly rain, and wait a couple of days to start plowing the south forty, after the rain is over.

Or if you are a general, you'll know that you can go ahead and blitzkrieg all you like—there isn't going to be enough rain to bog down your tanks and artillery and to make bad flying for your bombers and observation planes.

There are thousands of uses, in war and peace, work and play, for these new weather forecasts.

Twice weekly these longer-range looks ahead are sent out by the U. S. Weather

Bureau. The data on which they are based are assembled and interpreted on Tuesdays and Fridays. The Tuesday forecasts cover the period Wednesday-Saturday, the ones on Friday overlap them a day on each end, covering Saturday-Wednesday.

Basic Work in Boston

The work is all done at one central station; not in Washington, but in Boston. This is partly because the pioneer investigation leading to the new method was carried on largely at Massachusetts Institute of Technology under the direction of Dr. C. G. Rossby, who was on the Institute faculty before he became assistant chief of the U. S. Weather Bureau, in charge of research.

Boston is one of the district cities of the Weather Bureau, serving the New England area. Others are Washington, D. C., Jacksonville, Chicago, Kansas City, Denver, Salt Lake City, Southern California and San Francisco. For each district a separate forecast is made up and sent on from Boston by wire.

Two telegrams are sent to each district on the forecast days. The first, at not later than 11 a.m., consists of a long series of figures, meaningless to all but the weathermen themselves. This numerical code consists of the basic data gathered out of the air at many observation stations and reduced to terms of air pressure, temperature, etc., for spotting out on a map and connecting with the curving lines that have become so familiar.

The second telegram, filed before 2 p.m., is in plain English and resembles the one quoted at the beginning of this article. It is the interpretation derived from the scientific data by the meteorologists in Boston, and is sent to the forecast headquarters of each district.

The district forecasters will not necessarily issue this second message exactly as they receive it. It is intended for their guidance rather than for mere copying and re-transmission. Local conditions and last-minute developments may make modifications or omissions desirable. These the district man will make at his



A LOOK AHEAD

Commander F. W. Reichelderfer, chief of the U. S. Weather Bureau, leans back to take a good look at one of the maps on which the new five-day forecasts are based.

own discretion. Then the five-day forecast goes in final form to the newspapers and radio stations.

Instructions to the weather men handling the new forecasts call for proper caution in making statements. If there isn't better than a fifty-fifty chance that the forecast will pan out, the forecast is not to be made. If the chances of accuracy are between just an even break and three-to-one, the forecast is to be hedged with the word "indicated." Only when prospects look better than three-to-one is an unqualified prediction to be offered.

Science News Letter, September 7, 1940

PHYSIOLOGY

Very Essence of Life Is Absence of Repose

DO YOU seek rest? Look not among the living, is the admonition of Dr. R. W. Gerard, University of Chicago physiologist, in a new book *Unresting Cells*. The very essence of life, from simplest to most complex, is absence of repose, he points out.

Unresting motion is the mark of living protoplasm, whether in ameba or in man. When motion stops, it is safe to say that the organism (whether ameba or man) is dead. Life takes in the non-living, as food, water, oxygen;

and immediately imparts to the molecules its own unresting properties, rolling them into rings, tying them in strings, turning them for a time to its own ends. When it spews them forth again motionless, they are no longer a part of life.

In the end, Dr. Gerard draws a moral

for human society itself. Living systems, he says, constantly prevail against the second law of thermodynamics, which decrees that all things shall run down and become heterogenous, disorganized. In like manner, despite anarchic tendencies in some groups, human society will nevertheless survive and improve.

Science News Letter, September 7, 1940

PSYCHOLOGY

Predict Hitler's Downfall When Sacrifices Seem Vain

Any Break in Series of Successes Will Weaken Faith of People and Their Acceptance of Deprivation

WIN OR LOSE, Hitler and his cohorts are headed for downfall, Dr. Edward C. Tolman of the University of California predicted in his address as president of the Society for the Psychological Study of Social Issues.

Internal collapse will come in Germany, Dr. Tolman believes, when Hitler's armies fail to march on to new successes. This will be true whether those who oppose Hitler finally remain unconquered or whether they do succumb. Either way fresh victories must cease.

Demands Too Great

Collapse will come because the private in the ranks will not continue to sacrifice most of his primary animal needs, for adequate food, drink, sex, and family life unless he is continually rewarded by the satisfaction of ever renewed success of the Germany of which he feels himself to be an important part.

Hitlerism and Fascism will be defeated, Dr. Tolman said, not by an industrial revolution, but by a psychological revolution—by a new "religion" to take the place of the Nazi religion of nationalism.

A second reason for the downfall of Hitlerism, he sees in the fact that the elite do not practise what they preach to the masses. They do not suffer the same privations that they impose, and do not practise quite the same intensity of subordination to the group that they urge on the common people.

"Perhaps the original leaders—the Hitlers and the Mussolinis—do and can work permanently for the success of the group," he said. "The Hitlers and the

Mussolinis are, however, peculiar. They are driven by childhood and adolescent inferiorities. They can compensate only by the successes of the groups with which they have identified. But the second generation of leaders, who are now being trained, will not be so driven. They will not have started from nothing. They will have been early adopted into the elite."

In the new world order foreseen by Dr. Tolman all the grades of human wants would receive reasonable satisfaction, from the primary needs for food, shelter and sex to those broader desires for the welfare of all humanity.

The first set of needs could even now all be satisfied because of modern technology, he said. The difficulty has been one of distribution. This difficulty will be removed, he predicts, when leaders shift their emphasis from attaining them.

Better Ideals Needed

"If we can but imbue our children, not with the goal of getting rich, but with that of being rational and internally and externally cooperative human beings, the problem of the distribution of material goods will no longer be a problem but a straightforward task upon which leaders and led will naturally cooperate."

The second type of human desire—for success and prestige—can also be satisfied. Through guidance clinics and other psychological measures, it has been made possible to assure even for the feeble-minded the pleasure of doing some task well. When our attitudes toward success change, prestige will come to each not from being better than all

others, but in being the very best that he himself can be.

But man has a third type of needs, which has been played upon by the dictators—the real need for sacrifice, for submerging himself for the sake of the glory of his group or his leader.

Christianity has provided man with the satisfaction of these "superego" needs, but realization of sacrifice in Christian practise has too often meant a neglect of the more primary needs of man, or a promise of their satisfaction only in some future world, Dr. Tolman feels.

None of the needs of man may be ignored in the psychological Utopia of the future.

Men will be given an opportunity for sacrifice and devotion to higher ideals in all sorts of vocational groups and place-groups in which the individual can immerse himself. These larger groups must not stop at a nation, a class, a race, but with the whole of humanity.

To Face Real Foes

"We must not preach Americans against Germans," Dr. Tolman declared, "against Europeans, against Asiatics, against Africans, but all humanity against nature, against disease and misery and ignorance—against battle, murder and sudden death. Our violent aggressions—our wars—will then occur not between one group and another but between the whole of humanity and hostile nature."

How is such a Utopia ever to be attained?

Dr. Tolman has but one answer—education.

"By education," he explained, "I mean what goes on in the nursery school and in the home, in secondary schools and in colleges, in trades unions and in chambers of commerce, in CCC camps and in universal military training camps (if we get them), in the churches and in the market place, in pressure groups and in Congress. In all these institutions we must have everlasting teaching and propaganda always in the direction of the harmonious balancing in all classes of human satisfactions."

"Our present society is going under. The myth of Economic Man has disappeared or is just disappearing. The myth of Heroic Man (dictatorship) has come. But it also is going to disappear. And we here in America have perhaps still time to combat this myth of Heroic Man, not through adopting it ourselves—that will be our ever constant danger—but only, if (now that technology has

been solved), we see to it that this technology be used not merely in the name of America and the American way of life, but in the name of a human, a psychologically informed way of life.

"Then our aggressions which we shall still have and shall still enjoy will take themselves out not against our fellow

men but against disease and starvation and maladjustment.

"We shall fight primarily not against the Nazis and Hitlers abroad but always and simultaneously here at home against the myths which they symbolize."

Science News Letter, September 7, 1940

ORDNANCE

Ideal Light Machine Gun Sought by U. S. Army

WANTED, by the U. S. Army: the ideal light machine gun. Inventors will have one year and one month to produce.

Notice to this effect is carried in the September-October issue of *Army Ordnance*, giving specifications to be met and describing tests that are to be fired during the month of October, 1941.

Specifications boil down as follows: Weight must not exceed 22 pounds, so that one soldier can pick up the gun and walk off with it. Over-all length, 38 inches or less. It must be air-cooled: liquid cooling adds weight and is a messy nuisance anyhow, in a weapon that must be ready to move on a split second's notice. It is to be bored and chambered for the standard .30 caliber Army cartridge.

The new gun must have its barrel capable of being unscrewed from the front, so that a new barrel can be put on in a few seconds. The barrel must be heavy enough so that it can be fired at full speed (300-350 shots a minute) for five minutes without stopping.

It must stick close to the ground, to present as low a target as possible. Mounted on its tripod, the gun should not exceed 18 inches in height.

Ammunition is to be fed in from the left side, in metal-link belts. Cloth-web belts are apt to make cartridges stick in wet weather, and box-magazine and clip feeds are not considered satisfactory.

There are some other specifications, mostly technical in nature. But if a machine gun can meet the requirements as just stated, have the stuff to "take it" under regular knockabout field conditions, and be able to swing around through a wide arc of fire, it should have a good chance of adoption as the standard weapon of its type for the new U. S. Army.

In setting forth the requirements for

the new light machine gun, Brig. Gen. Earl McFarland of the Army's ordnance department reviews some of the machine weapons now in the American and foreign services. Weapons like the Lewis and Bren guns, now most used in the British army, are often referred to as light machine guns but are more properly machine rifles, he says. Like the Browning automatic rifle of World War fame, they are capable of bursts of fire only up to the capacity of their loading clips—30 in the case of the Bren, 20 in the Browning. A real machine gun, even a light one, must be able to keep up sustained fire, fed either from a belt of cartridges or a magazine of some sort.

Science News Letter, September 7, 1940

AVIATION

Biggest Flying Boat Being Built for Navy

BIGGEST flying boat in the world is now under construction at the plant of the Glenn L. Martin Company, in Baltimore. Destined for the U. S. Navy, the start of the "flying battleship" was marked with a keel-laying ceremony, time-honored custom in the building of surface vessels, but never before applied to aircraft.

No information has yet been released on the new airplane, which will serve as a bomber. However, it is obvious that it will considerably exceed in size the Navy's present largest aircraft. This is the type known as the XPB2Y-1. It weighs 29 tons, has a wing span of 115 feet, length of 79 feet and height of 28 feet. It is powered with four Wright engines, of about 1000 horsepower each.

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Over half a million pads of the moss peat from bogs of Maine, Oregon and Washington were prepared for surgical dressings in World War days.

An ordinary snap-type mousetrap is part of a novel apparatus devised at the U. S. Bureau of Mines for collecting air samples in mines, manholes and other inaccessible places.



FUTURE DREADNAUGHT OF THE AIR

The aeronautical equivalent of a battleship's keel-laying, when Glenn L. Martin, president of the aircraft building company that bears his name, drove the first rivet in the frame of a giant new flying boat for the Navy. Opposite him, holding the bucking-block against the rivet, is Capt. DeWitt C. Ramsey, U.S.N.

ARCHAEOLOGY

War Hampers Archaeology

With Digging Practically at Standstill in Classic Sites Of Old World, Americans Concentrate on Home Soil

By EMILY C. DAVIS

Archaeologists are blocked by this war. The amazingly rapid rediscovery of the world's buried past is being seriously slowed down.

In a world gripped by strife and uncertainty, there are undoubtedly lessons to be learned by digging up forgotten battlefields, palaces, vanished empires, and other evidences of man's struggle through civilization. Yet, except for a few lands, the United States notably among them, there is less digging by archaeological expeditions today than in many a year.

Nobody can dig in Europe, unless it is to build bomb-proofs. Well, hardly anybody. A lonely little report from a German propaganda source does say that "Norwegian archaeologists, with assistance of the German authorities, have resumed the excavations on the site of the graves of Viking kings."

Norwegians may really have hopes of finding another richly laden Viking burial ship at Oseberg, like that of a ninth century Viking queen struck by the lucky spade of a Norwegian farmer some years ago. So complete was the royal furnishing of this ship for a voyage into the future, that archaeologists have compared it to the tomb of Egypt's Tutankhamen. Like Tutankhamen's tomb, the Oseberg ship revealed to a modern world luxuries and standards of the past.

A Forgotten Science

Otherwise, a Science Service survey shows that throughout war-stricken Europe archaeology resembles a forgotten science. Expeditions have been called off, postponed, or abandoned.

Americans who have been opening up to daylight the market place of ancient Athens, summer after summer, under direction of Prof. T. Leslie Shear of Princeton University, have given up trying to work amid so much uncertainty. Athens has air-raid shelters these days—in case. Leaving a small staff to guard the grounds and the more recent discoveries, most of the expedition staff members have returned to the United States, though not for good, they hope.

In the Near East, there is actually

some effort to continue the search for buried history.

A party of Americans, excavating in Syria near the Turkish border, calmly announced their intention to keep right on digging as long as possible, regardless of French colony status and war in the Mediterranean.

These men, from the Oriental Institute of the University of Chicago, are on the track of a particularly desired missing link in ancient international politics. They do not want to give up, now.

Goal of their excavations is a city of the almost unknown kingdom of Mitanni. Once, the lords of Mitanni were so powerful in world affairs that they formed an international triangle with the other major powers—the Egyptian and Hittite empires.

Germans Had Option

For years German archaeologists held an option to dig at a mysterious Syrian mound near the Turkish border in the Khabir River valley, where an important city of this era was believed hidden. But the Germans failed to arrange the expedition. The French at length withdrew the concession, inviting America's Oriental Institute to open the mound. And now, with a modern world crisis and tangle around them, experts of the past are seeking to clear up surprisingly forgotten international tangles in 2000-1000 B. C. history.

Hope is that the Syrian mound will contain a palace and governmental headquarters of the powerful and militaristic Mitanni. Even more important for understanding their role in world history would be discovery of the correspondence files, probably buried in palace ruins. These might enable scholars to learn secrets of diplomacy and government which shaped world events in the Egyptian-Hittite-Mitanni triangle. Curiously, we may yet know more completely what happened than did people of that time.

Mitanni figures in Bible narrative as the Hurrian state and the Horite people.

The oldest steel weapon ever discovered, a battle-axe recently unearthed in Syria, has brought a flash of modern

publicity to Mitanni's munition makers. Primitive steel of the axe head is attributed to Mitannian workmanship of about 1500 B. C.

In the Near East, too, exploration of King Solomon's factory-town and seaport, Ezion-Geber, has gone right along, war or no war.

Removing tons of sand from this ruined city, in a third springtime digging season, Prof. Nelson Glueck, of the American School of Oriental Research in Jerusalem, has just completed his work. Ezion-Geber, near the horn of the Red Sea, will soon be covered by wind-blown sand again, but not forgotten. The excavations have made plain King Solomon's business executive ability and understanding of trade and industrial problems of 1000 B. C.

Viewing his copper smelting plant and other commercial ventures in the seaport, the anxious visit of the Queen of Sheba, whose trade was threatened, is far better understood, though it still



AT NAPOLEON'S HILL

A Hebrew University student solves a clay jigsaw puzzle from depths of the Palestine mound called Napoleon's Hill. The pitcher was used in the period 1200 to 1000 B.C., when the Israelites were establishing their kingdom.

remains to be learned what she won from Solomon when the Bible reports that he gave her all she desired.

On the other side of the Jordan River, in Palestine itself, the Hebrew University has managed to continue digging at a site Napoleon made famous. Napoleon's Hill, the place is called, because in 1799 Bonaparte made his headquarters on the top when he was battling the Turks.

Trodden by Napoleon

Under Napoleon's feet then lay hidden ruins of a town which had been fought over in raids and battles several thousand years before his campaign. Napoleon would have been interested, had he known. He encouraged archaeology.

Called today Tell Jerisheh, the old name of the buried town is quite unknown. Prof. Eliezar L. Sukenik, Hebrew University archaeologist, is working with student assistance to probe the entire history of the site. In four seasons, he has traced its story back to somewhere between 2000 and 3000 B.C., which is before the days of Abraham.

Evidence that the town played a strategic role is revealed by the fortifications of different eras. Located as it was near the Yarkon River, where merchant ships could reach it from the sea, this unnamed town feared sea raiders particularly, and at least once was destroyed by them. Last inhabitants appear to have been Israelites, whose boundary reached the Yarkon River region.

Work in United States

In the United States, the roll call of expeditions taking the field to unearth the country's prehistory reveals not quite "business as usual," but at least expeditions in a great many states.

One spotlight is on New Mexico, where Dr. Frank C. Hibben of the University of New Mexico has been finding that there were Americans even older than the famous Folsom hunters, who are now widely accepted as having been here in the Ice Age, 20,000 years ago.

Sandia Man, still older, is revealed by his distinctive weapons, found by Dr. Hibben in a cave in the Sandia Mountains. But Sandia Man himself is missing to date, and is still being sought.

Folsom Man, likewise, is a missing man of early America, still known entirely by his tools and camp ground debris. The search for his burying ground, if he did indeed bury the dead, is one goal of the Smithsonian Institution expedition of Dr. Frank H. H. Roberts, Jr., at the Lindenmeier site in Col-



DISSECTING AN INDIAN MOUND

Halfway in the excavation of a large, flat-topped mound in Butler County, Kentucky, archaeologists have uncovered old floor levels on which the ancient Indians had built living or ceremonial structures. The earth pillars left standing serve as a check on previous work in the excavation as progress continues.

orado. At this site, Folsom Man first became a full-fledged personality, by reason of Dr. Roberts' unearthing of a variety of the hunters' tools, the evidence of their stone-working right on the spot, the traces of their paint for decoration, and other clues which an expert can build into a picture of American life in the Ice Age.

Rescuing Indian settlements from the path of farm plows, from rising waters of newly constructed dams, and other hazards that would wreck pages of history forever, is still proceeding, with help from WPA and CCC workers.

Because of the national defense program, long-buried secrets of the Tennessee Valley will come to light faster. Speed-up in building TVA dams means corresponding speed-up in excavating Indian village sites and burial mounds in the path of reservoir construction, Prof. T. M. N. Lewis, University of Tennessee anthropologist, has declared. Prof. Lewis is directing this WPA-financed archaeology project.

Much information about the earliest group of Indian pioneers who settled in the valley is being found in digging at the Watts Bar area, he states. Probing here, the archaeologists have struck what appears to be the focal point for

Indians of the region. In the Kentucky Dam area, also, excavation work with a field crew of more than 100 is being pushed.

Says Prof. Lewis: "The archaeological program, which has resulted in the University of Tennessee obtaining one of the finest study collections of Indian artifacts in the United States, began as the result of a protest by a Knoxville group. They had learned that the TVA construction work would flood unexplored mounds and village sites in the Norris reservoir area, and urged that archaeologists hurry to rescue this endangered chapter of American prehistory."

A Kentucky Archaeological Survey, directed by University of Kentucky scientists and made with WPA aid, has not merely explored Indian mounds in approved and precise archaeological techniques, but has pioneered by excavating one of Kentucky's largest earth mounds in a fashion never attempted before on so large a scale. Profile cuts into the mound revealed the layered sequence of its history, and then, encountering tombs and other features, the excavators isolated these fully and skirted them in the digging. Later the tombs were individually dissected and investigated for a

(Turn to Page 155)

PHYSIOLOGY

Ice Bag on Forehead Lowers Brain Temperature

HEADACHE victims who find an ice bag on the forehead soothing really are cooling off that part of the brain right through the skull. So Dr. William Bierman, and Dr. Mae Friedlander, of Mount Sinai Hospital, New York, were enabled to report to the Cleveland meeting of the American Congress of Physical Therapy, as the result of an unusual opportunity to measure brain temperature of a human being.

While ice bags lay on the forehead of a patient from whom a brain tumor had been removed. Dr. Bierman inserted a thermocouple into the frontal part of the brain. Two inches below the forehead surface, the brain was cooled a degree and a half Fahrenheit.

Cold has received less attention than heat, as an ameliorating influence in disease, the investigators stated, but they predicted greater use for cold. Their experiments with human beings indicate that cold applied to skin surface penetrates deeply.

Ice bags on the calf of a patient's leg lowered temperature deep within the leg muscles as much as 26.4 degrees Fahrenheit, they discovered. Testing the general supposition that drafts of cold air have no particular effect upon structures lying beneath the skin surface, they blew cold air on the leg calf and found that within the muscles the temperature dropped as much as 11 degrees.

Cold applied to the abdomen seems to influence organs within, they reported from other tests, though the cooling was not very great.

Science News Letter, September 7, 1940

PHYSICS

New Plane Detector Works Like Electron Telescope

THE REPORTED British sensitive detector for enemy airplanes, which makes use of invisible rays from the plane's engine, probably employs the infra-red radiation given off from any hot object and makes it visible by a method similar to that employed in the electron microscope recently developed to permit ultra high magnification. A similar American device is said to have been tried at the maneuvers of the First Army, but no details have yet been made public.

At the December, 1935, meeting in St. Louis of the American Association for

the Advancement of Science, Dr. Vladimir K. Zworykin, Russian-born television expert of the Radio Corporation of America, showed an infra-red telescope that caused excited comment among the scientists. It was described in detail in a Science Service dispatch at the time (*SNL*, Jan. 11, 1936, page 20). Possible military uses were then predicted.

Infra-red rays are given off at night as well as during the day. They pass freely through haze and smoke, but any fog, except a very thin one, stops them. However, such a fog would hamper the movements of the airplane anyhow. Funnels of warships, like airplane engines, also emit infra-red rays, as do clouds of hot gases from engine exhausts. An observer not provided with such a telescope would be unaware of the rays going past him.

The electron microscope, demonstrated by Dr. Zworykin last April to members of the American Philosophical Society, employs an electron lens with principles similar to the infra-red telescope. Magnification of ordinary microscopes is limited because they will show no details smaller than the waves of light with which they are viewed. But the electrons are still smaller, and by focussing these, extreme magnifications, up to 20,000 times or more, have been secured.

Science News Letter, September 7, 1940

BACTERIOLOGY

Bacteria in Ocean May Use More Oxygen Than Fish

OXYGEN in the ocean is probably used up more rapidly by bacteria and other microorganisms than it is by all the fish, and other visible animals ranging from tiny shrimp to giant octopuses, suggests Dr. Claude E. ZoBell of the Scripps Institution of Oceanography.

Bacteria swarm in the depths in simply incredible numbers, Dr. ZoBell states. A quart of ocean water may contain anywhere from 100,000 to 10,000,000 bacteria, consuming oxygen at the rate of .001 cubic centimeter to more than one cubic centimeter per quart per year. This looks rather insignificant—but there are quite a number of quarts of water in the ocean, and the total becomes staggering.

Oxygen consumption becomes a particularly acute problem at great depths, for the only way this life-gas can get down there is to diffuse slowly from the surface—with bacteria and other living things snatching greedily at it all the way down. This dearth of oxygen may be an important factor in the paucity of life in the great abysses.

Science News Letter, September 7, 1940



GEOLOGY

Ice Age Glaciers Possibly Thicker Than Old Estimate

GLACIAL ice may have been piled up ten miles high, during the great pleistocene ice age half a million or more years ago. This extreme figure, ten times greater than the usual estimate, appears necessary to account for the cutting of the steep-sided canyons in the bottom of the sea, some of which have been discovered at depths approaching 3000 feet.

The problem is something like this: The canyons are so much like those cut by rivers on land that it is hard to imagine any other method of formation for them, says Prof. Francis P. Shepard, University of Illinois geologist now working at the Scripps Institution of Oceanography. To make dry land of ocean bottom to such great depths, the water had to be got out of the way.

The only way that can be thought of is the age-long stacking up of the water in the form of ice. To get enough water out of the ocean to lower sea level as much as 3000 feet, it would be necessary for the ice to cover much more territory than is now commonly mapped as glaciated, and probably also to be accumulated to perhaps ten times the formerly estimated depth.

Science News Letter, September 7, 1940

METALLURGY

Aluminum Smelter Scene Offers Strong Contrasts

See Front Cover

ALUMINUM is very much to the fore nowadays, as this country makes powerful efforts to increase its aircraft production. About four-fifths of the weight of a modern war plane is made of the white metal.

A study in black-and-white, might be an appropriate title for the picture reproduced on the front cover, wherein a brawny Negro workman is tossing fifty-pound ingots of the white metal like loaves of bread. The photograph is by Margaret Bourke-White.

Science News Letter, September 7, 1940

SCIENCE FIELDS

PLANT PHYSIOLOGY

Oxygen Controls Tissue Mass Growth

OXYGEN abundance or lack apparently determines character of growth in masses of plant tissue grown detached from the parent plant. The cultures are comparable to the animal tissue cultures made famous by Dr. Alexis Carrel. So long as they receive plenty of oxygen, plant tissue cultures continue to grow without differentiation among the cells, it has been discovered by Dr. Philip White, of the Rockefeller Institute for Medical Research at Princeton, N. J., a pioneer in this newer field of tissue culture research.

But let a lack of oxygen supervene, and the cell mass begins to differentiate. Simplest case of this kind is that of a tissue mass that has been permitted to grow so large that air does not reach its center very readily. Some of the cells develop into conducting vessels with spirally reinforced walls, resembling those found in the interior of normal plant stems. These presumably let oxygen in and waste products out.

Even more striking are the results when the oxygen starvation is artificially intensified. Then the previously undifferentiated tissue mass proceeds to produce small leaves, supported on short stems. If the full supply of oxygen is then restored, the fledgling foliage gradually reverts to its embryonic, undifferentiated condition.

Science News Letter, September 7, 1940

PUBLIC HEALTH

Bad Outlook Reported On Infantile Paralysis

ABAD infantile paralysis year is the outlook now, as reported cases of the epidemic, most serious in the Midwest, leaped to 623 for the week ending August 24 from 389 reported the previous week.

In 17 states the disease is on the rise, as shown by U. S. Public Health Service figures. If this were to be an average year, judging by figures for recent years at this stage of summer, only 289 cases would have been reported in the week.

In West Virginia, where 46 cases were reported in a week, a call from health officers has sent Dr. James P. Leake of the U. S. Public Health Service to one scene of the disease battle.

To aid health officials of Indiana—where the week saw 79 new cases of the disease—the National Foundation for Infantile Paralysis is taking action at top speed, to curb the epidemic's spread and to help the stricken. Iron lungs have been rushed to stricken areas. Shipments of splints and frames have been hurried to South Bend and Indianapolis.

After two trips through Indiana, Dr. Don W. Gudakunst, medical director for the Foundation, declared that much of the crippling effect of the disease will be prevented because of splendid work being done by physicians and nurses.

"The important thing," said Basil O'Connor, the Foundation's president, "is to get every case under treatment as quickly as possible and be sure that proper treatment is provided. Instruction has been given by Foundation experts on early treatment."

Possibility that drinking water and swimming pool water can spread infantile paralysis, a theory discounted in recent years, may regain serious attention, since Michigan scientists this summer reported that ordinary chlorination of water does not kill the virus of infantile paralysis, if it is present.

Statistically, the infantile paralysis epidemic on paper is now following the lines of 1937, which had the high total of 9,511 cases when returns were in. The curve may, however, take a more fortunate turn and not entirely repeat history. The peak of the infantile paralysis season usually occurs toward mid-September.

Science News Letter, September 7, 1940

ENGINEERING

New Unit Provides Air Conditioning in Labs

AIR CONDITIONING for laboratories, where standard conditions of temperature, humidity, etc., are required the year round, is taken care of by a new unit specially designed for the purpose. (Carrier Corporation.) It takes care of cooling, heating, humidifying, dehumidifying, filtering, circulating and ventilating. Only three connections are required, water, drain and electricity. The unit will serve a room of approximately 1200 cubic feet.

Science News Letter, September 7, 1940

METEOROLOGY

Weather May Force War To Go South For Winter

IF HITLER'S hopes of conquering Britain this year have to be deferred because of the coming of Britain's much-advertised foul autumn weather, the war may possibly go south for the winter.

Bombing of British ports and manufacturing centers will be made more difficult by stormy winds and fogs.

British aviators will, of course, know about clearing conditions before the Germans do, for storms over the North Sea move as they do in this hemisphere, prevailingly from west to east. This might often enable British bombers to "ride the tail of the storm" and get over Germany just as the clouds break up.

British planes would not need to be condemned to inactivity even in periods of settled bad weather. So long as they can take off at all, they can climb into the clouds and fly blind toward the southeast, emerging into clear skies over Italy, long a favorite winter resort for English folk. Winter weather protection over Hamburg and Essen may well bring increased air attacks on Milan and Turin.

If developing storms make it inadvisable for the planes to return to Britain at the end of the raid, they might go on to Egypt, where by then another phase of the war gone south for the winter may be developing, with Italy's land attack upon Egypt. With bomb racks reloaded, the planes could then take a whack at the Italian camps and communication lines; and perhaps by that time they might be able to go on home again. A "shuttle service" of this kind was discussed as a possibility when the Polish campaign opened a year ago, but it never had a chance to get started.

Science News Letter, September 7, 1940

ENGINEERING

Fluorescent Lighting For Pullman Berths

FLUORESCENT lighting is now possible in many places where the large tubes previously available could not be placed, such as Pullman berths, cabins of airliners, in closets, bed lamps, and over mirrors and portraits in the home. (Westinghouse Lamp Division.) A new fluorescent lamp is only nine inches long, and about the thickness of a man's finger. It takes six watts of current, and is made in two colors, one approximately daylight.

Science News Letter, September 7, 1940

ASTRONOMY

Eclipse Will be Observed From Brazil and South Africa

Several Parties Already on Way to Points of Vantage In Southern Hemisphere; Special Apparatus Carried

DESPITE difficulties imposed by the war, astronomers and other scientists are taking their positions in South America and South Africa along the path where the next sun eclipse will be seen on Oct. 1. With the U. S. Navy so busy preparing for better national defense, the proposed expedition from the Naval Observatory in Washington has been called off. But at least four other American groups are either on the way, or preparing to leave.

One of these, from the Cruft Laboratory at Harvard University, has taken about ten tons of equipment to Queenstown, South Africa. Much of this is electrical and radio apparatus, for study of the behavior of radio waves at eclipse time is one of their principal aims.

To Measure Ultraviolet

Dr. J. A. Pierce, who is in charge of the party, has explained that one of their researches will measure the amount of ultraviolet light from the sun which is absorbed in the upper atmosphere. This absorption knocks electrons from the gaseous atoms. These free electrons form layers which reflect radio waves as a mirror does light. They are important to long distance radio communication for otherwise the waves would spread out into space, and would not bend around the earth's curvature.

The number of such electrons in a cubic centimeter can be determined by finding the shortest radio wave that will be reflected. Their height above the ground is obtained by broadcasting a series of very short radio impulses. A receiver alongside the transmitter receives these signals, first directly, then after they have been reflected, a minute fraction of a second later. The time difference is greater, the higher the reflecting layer.

As the moon's shadow passes through the atmosphere, 100 to 200 miles above the ground, the ionization, or breaking off of electrons, is changed, and this will be studied by the observers. Since there are large variations from other causes, it will be necessary to make observations for a total period of about three months,

to show the normal conditions with which the eclipse data may be compared.

Clear weather is likely at Queenstown on the afternoon of the eclipse but, unlike the astronomers, these observers do not mind clouds, for the radio waves penetrate them freely. However, for record purposes, and also to check the timing, a complete motion picture film of the eclipse from beginning to end will be made. The total phase of the eclipse, when the moon will completely hide the sun, will last about 3 minutes 10 seconds at this location.

Use "Ash Can" Camera

Other American parties will be in South America, near Recife (formerly Pernambuco), Brazil. A powerful star camera, familiarly called the "ash can," will photograph the eclipse from Quixeramobim. It will be used by a party from Brown University, under the leadership of Dr. Charles H. Smiley, director of the Ladd Observatory.

Optical parts of the instrument, known as a Schwarzschild camera, are mounted in an aluminum cylinder four feet long and 15 inches in diameter. Thus comes the undignified name applied to it by the astronomers. At the bottom of the tube is a twelve-inch diameter aluminum-coated concave mirror, which reflects the light of a heavenly body to a second smaller six-inch mirror 45 inches above. This sends the light back through a hole in the main mirror, where it falls on a circular film, two inches across.

In general, the path of the light is the same as in the Cassegrain telescope often used by astronomers, but the curves of the mirrors are different. A much wider angle of view is thus obtained, for the area covered will be about 36 times the diameter of the sun. Named after the German astronomer who invented it in 1905, only one successful model has previously been made, by Dr. W. A. Cogshall, of the University of Indiana. Dr. Smiley's camera was constructed by a group from the Skyscrapers, Providence astronomical society, which is

sponsoring his expedition jointly with the university.

Dr. Smiley hopes to use the camera to photograph the zodiacal light, a double wedge-shaped halo seen near the sun, and believed to come from myriads of minute particles circling around the sun. At an eclipse visible in Peru in 1937 he made photographs with another type of camera which seem to show the effect. The instrument used then, known as a Schmidt camera, will again be employed this year.

Near Center of Path

Another expedition departed recently when a party under the joint auspices of the National Bureau of Standards and the National Geographic Society started for South America. They intended to go first to Recife and then travel some 200 miles inland to the village of Patos.

Only five miles south of the central line which the moon's shadow will trace across the earth, this location offers many advantages. The sun will be covered for nearly five minutes. The chance of cloudy weather interfering is minimized because the site is in a high, dry plateau region. An American cotton company has a gin at Patos, and thus mechanical and electrical facilities will be provided that might otherwise be difficult to obtain.

Observations of the sun's corona, seen best at eclipse time; spectroscopic studies of the solar atmosphere; a color motion picture of the entire eclipse, including partial phases, from start to finish, and measurements of the behavior of radio waves in the moon's shadow will be some of the problems investigated by the group. To accomplish this, seven and a half tons of equipment, including cameras, spectrographs, clocks, motors, batteries and radio apparatus, will be transported to Patos by truck from Recife.

Robot Program Clock

A novel feature will be an automatic program clock which will make sure that camera shutters are opened and closed, switches turned on and other operations performed at the precise instant during the fleeting moments of totality. After the exact schedule has been determined, a roll of paper, something like that of a player piano, will be punched with holes. As this is unwound by a motor, metal fingers will feel the holes, and close electrical circuits to operate the equipment. Some fifty years ago, at an eclipse in Africa, and later at one in Japan, Prof. David

Todd used a similar idea, operated pneumatically, like the player piano. Probably because of its complexity when air-operated, it has never been used since.

Dr. Irvine C. Gardner, chief of the optical instruments section of the National Bureau of Standards, will head the party. Accompanying him are Dr. E. O. Hulbert, of the Naval Research Laboratory; the Rev. Dr. Paul A. McNally, S. J., director of the Georgetown University Observatory; Dr. Carl C. Kiess, spectroscopist, and Dr. Theodore R. Gililand, radio research specialist of the Bureau; and Richard H. Stewart, staff photographer of the National Geographic Society.

In addition, a group from the Amateur Astronomers Association, in New York, led by Charles A. Federer, Jr., editor of the magazine *Sky*, will leave early in September for Campina Grande, Brazil, a city of about 90,000, through which the National Geographic party will pass on their way to Patos.

Science News Letter, September 7, 1940

GEOLOGY

Life Founded Upon Rock, Is Argument of New Book

ASK FOR bread, and you must first receive stones. For there can be no bread without there first being stones.

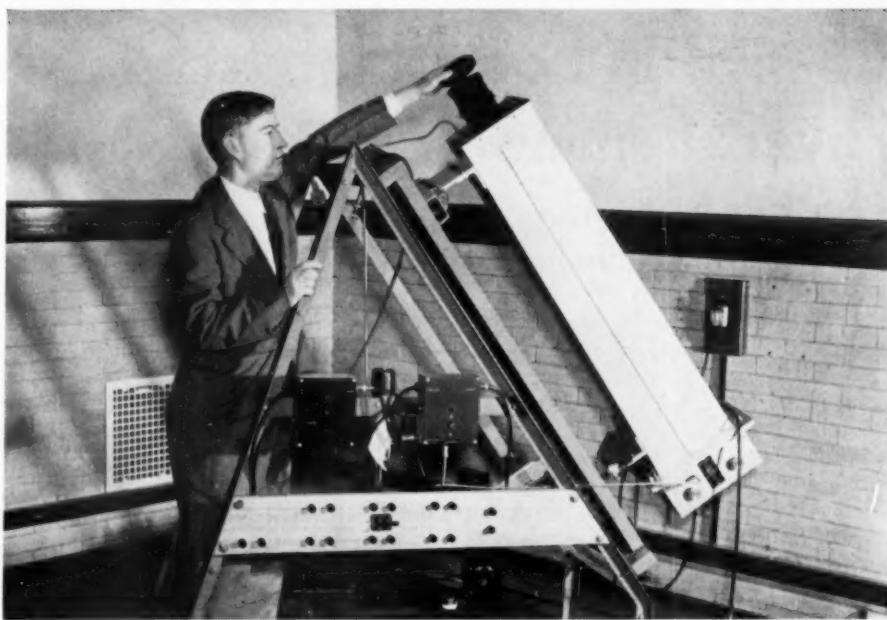
Such is the argument which opens the first chapter of a new volume, *The Rock Book*, by Dr. Carroll Lane Fenton and Dr. Mildred Adams Fenton.

Rocks, declare the Fentons, "decide what shape the earth shall have, how its outer part shall shift and what its surface shall look like. They also determine what plants and animals shall do on this planet, telling where, when and how they may live."

This claim is substantiated by rapid examples: Plants must have minerals, which can come only from dissolved, broken rocks. Animals' habitats are determined in one way or another by rocks, from the barnacle on the seashore ledge to the cony among the tumbled mountain stones. Man himself has lived successively in rock caves, stone-built castles, and apartment houses of reinforced concrete—which is an artificial stone. A modern knowledge of rocks (and their offspring, soil) is indispensable for successful farming, mining, engineering, industry of all kinds. Life indeed is founded upon rock.

Science News Letter, September 7, 1940

An insect "zoo" of living pests that damage crops was a feature of the New York State fair at Syracuse in August.



TO PHOTOGRAPH THE HIDDEN SUN

Dr. Irvine C. Gardner, leader of the National Geographic Society-National Bureau of Standards Solar Eclipse Expedition, makes final adjustments to one of the specially built cameras with which the expedition will photograph the eclipse on Oct. 1. The camera will take 12 to 15 photographs of the corona, the halo that extends outward around the sun but which can be seen only during total eclipses, during the moon's five-minute blackout of the sun.

From Page 151

set of records pronounced unique in American archaeology.

In Oklahoma, to take another example, Indian villages and cliff dwellings in the path of Grand River Dam are being examined while they can be, by WPA workers directed by Dr. Forrest E. Clements of the University of Oklahoma. Indians of Oklahoma are shown here as trading with tribes as far away as the Gulf of Mexico. They are also shown as skilled in cloth making and many crafts. No more than six months of exploration is expected at one area, where the work of the dam will have to proceed.

Mexico, like the United States, is keeping up its archaeological field work in

more or less usual manner, with the excavation and repair of Indian temples, pyramids, and monuments.

Rated one of the youngest sciences, archaeology has made amazing strides in the Herculean task of digging up buried history the world over, and some archaeologists think it a good thing to have a breathing spell from so much digging. Now is the time, they philosophically say, to study valuable evidence that has been unearthed and carried safely to laboratories, and to write more fully what it all means.

Science News Letter, September 7, 1940

Alaska bought more than \$44,000,000 worth of goods from continental United States last year—a record.

● R A D I O ●

E. K. Cohan, director of engineering of the Columbia Broadcasting System, will describe the new 50,000-watt transmitter to be constructed on Long Island Sound, as guest speaker on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, Sept. 12, 4:00 p.m. EDST, 3:00 EST, 2:00 CST, 1:00 MST, 12:00 PST.

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NUTRITION

Change in Food Habits May Avert Famine in Europe

Good Corn Crop Offsets Shortages in Wheat and Rye; Oils and Fats Figured at 25% Less Than Normal

HUNGER for some of Europe's millions will be lessened in days ahead, provided they can do a difficult thing—change their food habits. So it appears from latest reports from the European war food front, studied by agricultural economists.

The Continent's short crops of rye and wheat, for example, may be balanced against a good corn crop in southern Europe and against a good potato crop, for somewhat reassuring totals on "food." But can peasants in countries unaccustomed to corn make good use of it? There's a catch in the arithmetic. Yet, from German sources has come the grim warning that conquered areas must exert themselves to the utmost to feed themselves.

"By tightening their belts and making some changes in their food consumption habits, they should be able in most sections to get through the winter," is the way the situation looks to the U. S. Bureau of Agricultural Economics.

It foresees likelihood, however, of a serious situation in some regions, and among some consumer groups, because of difficulties in adjusting the food available to the requirements of the people.

Americans will recall that teaching hungry French and Belgians to eat American cornmeal, instead of wheat flour, during World War days proved so

herculean a task that the United States settled down to using the corn and sending more wheat to Europe.

Nutritionists explain that this was not sheer contrariness on the part of hungry peasants. The French are more used to buying bread than baking it. Their farmhouse ovens are far different from quick American stoves. Cornmeal was thus a double problem—unfamiliar to taste and a major problem to handle.

As for rice, some Belgians found it too strange for eating. Paradoxically, in rice-eating areas of India efforts to break rice famines with other foods have met with difficulty. It had to be rice.

In our own country, the southern share-cropper clings to a pellagra-causing diet of monotonous cornbread, fat-back, and molasses. It is a major victory when nutritionists can win over these, or other Americans, to unfamiliar foods needed to round out a diet.

Europe's worst food debits are in the rye and wheat crops, as the situation ap-

pears now. The fruit crop is also figured as smaller than last year's large crop. Supplies of fats and oils are probably 25% less than normal. The Continent depends on outside sources for about half of the fats and oils it uses, and what its hoarded reserves now amount to is not known.

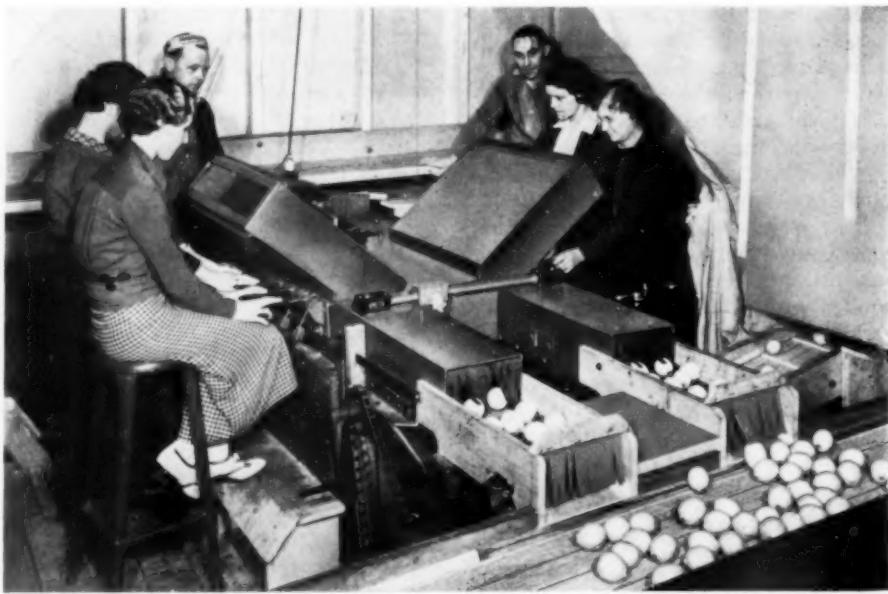
On the credit side of the food ledger, however, are the large corn and potato crops; a large vegetable crop; adequate supplies of sugar, doled out by rationing; considerable supplies of meat for the present, due to slaughter of more animals than usual.

Balancing conditions on the egg situation, it is figured that, while many of northwest Europe's hens will be killed and commercial egg production reduced, the loss of the British market for eggs "may leave almost normal supplies of eggs available for Continental consumption."

Disposal of these uneven supplies is another problem, hinging on transportation uncertainties and other fortunes of war. Eating whatever comes their way is the prospect for Europeans caught in these war tangles, and faced with what the most conservative observers term an "uncomfortable" winter.

Science News Letter, September 7, 1940

The most populated regions of South America are geographically closer to Mediterranean lands, or even to England, than they are to the United States.



X-RAYS FIND HIDDEN FAULTS

Beneath the fair smooth skin of an orange may be a ruined, inedible fruit. Watchers at the fluoroscopes over this conveyor belt in a California packing plant can see right through the oranges, discarding the good-looking bad ones. X-rays serve in like capacities in a thousand other industries, from breakfast food to armor plate.

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PHYSICS

X-Rays Bring Many Helps To Nation's Industries

By WEBB WALDRON

THE X-RAY has gone into business. The machine, developed primarily to aid in diagnosing human ills, now works in packing plants, in foundries, in service stations, and in a dozen ingenious ways contributes to precision and accuracy in industry.

Maintenance men for the Detroit Edison Company, to be on the safe side, condemned and replaced many poles which seemed to be rotting but later proved to be perfectly sound at heart. Now an X-ray machine mounted on a truck peers into the poles where they stand, determines their condition, and thus saves the company a lot of poles and a lot of money.

California and Arizona citrus fruit growers use 100 X-ray machines to sort their crop. With them, after one severe frost, California salvaged 2,000,000 boxes of oranges which would have been condemned by ordinary methods. The machines had cost \$250,000; the oranges they saved for market brought \$7,500,000.

Peanuts coming into the packing plant bring with them pebbles and lumps of dirt. Neither screens nor the electric eye could detect them all, but the X-ray spots them. Makers of chewing gum, candy, and tobacco now use it similarly to detect foreign substances.

Firestone Tire and Rubber Company X-rayed the tires on 100 cars chosen at random, found nails or bits of glass imbedded in 99% of them. Fabric breaks, good for eventual blow-outs, also showed up. Now service stations are installing X-ray, which is cheaper and better than demounting tires and inspecting them by sight and feel.

"X-ray your tires?" said an attendant at a service station. He jacked up my car, pushed an X-ray machine into position, put his eyes to the viewing hood and slowly began to revolve one of my front wheels. "There, look," he said. Peering into the hood I saw a dark mark at right angles to the tread of the tire. "Nail," said the attendant. The X-ray apparatus found two more nails in that tire, all imbedded deeply, invisible from the outside.

Five thousand stores fit shoes by X-

rays, at least one manufacturer designs his shoes with the help of the machine. Golf balls are X-rayed to be sure the core is in true center—otherwise the ball will be erratic in flight.

In testing metals, X-ray shows up interior bubbles and cracks otherwise never suspected until some machine smashes up under stress. All airplane parts subject to strain are X-rayed. Navy inspectors, X-raying a turbine for a destroyer, discovered that a contractor had filled a crack in a casting with a metal plug and hidden the trick with a plating of metal. All steam tubing for warships is examined by X-ray; bursting steam lines might cripple a ship in action, mean horrible death for men below decks. One of the biggest jobs ever tackled, speaking of sheer physical dimensions, was the examination of 80 miles of welds on Boulder Dam penstocks.

At the Bureau of Natural Pearl Information in New York I saw a \$20,000 necklace run through an X-ray machine. In it were four culture pearls which experts had not detected—worth about \$1 each. I could spot them myself; the natural pearls showed innumerable concentric layers, the culture pearl was a bead which the oyster had coated thinly.

Museums have found by this method that some paintings supposed to be by old masters are fakes. In addition to testing authenticity the X-ray is valuable to students in revealing the way an artist works and the changes which a painting may undergo before it is completed. At the Metropolitan Museum, New York, I saw plates of Veronese's famous *Mars and Venus*. Through lay-

ers of paint the ray reveals that Venus, who now stands nude beside Mars with Cupid at her feet, in the first version of the picture wore clothes and sat stiffly on Mars' lap, and Cupid wasn't there at all.

The pearl counterfeiter and the contractor who tries to gyp the Navy can be caught, but it is too late to do anything about some of the cheating the X-ray reveals. For instance, the Field Museum of Chicago can prove that one Egyptian embalmer was a crook. Examining a mummy by X-ray, it discovered that the body is missing. Head and feet are connected by a stick.

Industry is constantly calling on the X-ray people to solve new problems, and X-ray men are constantly thinking up new ideas to propose to industry. One would hesitate to predict what X-ray may not be doing tomorrow.

Some things it probably never will do. One man wrote in, asking whether an X-ray machine could be built to carry in your vest pocket, to read your opponent's poker hand. Another inquirer wanted a machine to see through the walls of his neighbor's house.

Science News Letter, September 7, 1940

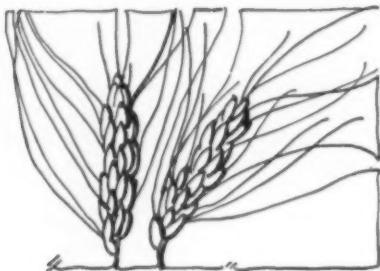
Since soaps and shaving soaps are *standardized*, trade names have disappeared in Germany.

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Finding Fortunes Afar

CULTIVATED plants and domesticated animals often attain the climax of their careers in lands remote from their native homes.

We are all familiar with the tale of the small-town boy who makes good in a distant big city, or of the unpromising immigrant who attains fame and fortune in a new country. Tales are equally familiar, of immigrant plants and animals that have won their way, though commonly we pay less attention to them.

Take the great staple crops of the United States: wheat, corn, cotton, tobacco, alfalfa, soybeans. Not one of them is native within our boundaries. Corn, cotton, and tobacco, to be sure, originated in the Western Hemisphere, and were under cultivation by the Indians when white men first settled here. But all three came from the tropical regions below the Rio Grande.

Wheat and the other small grains are all of Old-World nativity. Wheat's original home seems to have been somewhere in the Black Sea region, probably the Caucasus. Barley may have come from the same general neighborhood, possibly from the Iranian plateau; for it first appears under cultivation in Mesopotamia and Egypt. Rye is a plant of the Eurasian steppes. Rice is a swamp grass of southeastern Asia.

From Asia also came alfalfa and soybeans, the first from the dry interior, the second from the plains of China. They are quite recent immigrants into this country, but they certainly have made good in a big way. Asiatic also are all of our citrus fruits, as well as peaches, pears, almonds and "English" walnuts.

America has supplied plant emigrants to the Old World, that have scored big-

ger successes there than they have at home. Thus, the principal centers of cultivation of both Para rubber (from the Amazon basin) and quinine (from the Andes) are now in the East Indies, while the highest specialization in the "Irish" potato (from Peru and Chile) has been reached in Germany.

Africa and South America have inter-

changed two leading beverage crops. Coffee originated in Ethiopia, but the principal coffee-growing regions of the world now extend from southern Brazil to Salvador and Costa Rica. Cocoa, on the other hand, is native to tropical America, but is now a climax crop of West Africa.

Science News Letter, September 7, 1940

PSYCHOLOGY

Postponed Draft Favored For Psychological Reasons

POSTPONEMENT of compulsory military service until after Jan. 1 might have appealed to some Congressmen for reasons other than that it meant "passing the buck" to another Congress. The amendment providing for a delay of the draft until next year might have overcome the opposition of some persons.

The reasons are psychological. Probably many politicians regard the work of the laboratory psychologist who runs rats through mazes as of strictly academic interest. But the laboratory rat, with his simple, unregimented brain, is able to teach scientists a great deal about how minds work. This information applies to the very practical situations of politics.

A rat, running down an alley toward food, it has been found, will run faster as he approaches the reward. A light harness put on the animal has made it possible actually to measure the increase in the attractiveness of that piece of cheese as the rat comes closer to it.

But when an unpleasant event awaits at the end of the run, the rat's behavior is quite different. Now he slows and hesitates as he gets nearer or he may turn and bolt.

If he is set down in a runway and knows that punishment awaits at both ends, he may run back and forth and finally, at the middle of the runway hesitate and vacillate until he is close to mental breakdown.

Translated into what faced the lengthily debating Congressmen this means that some may have feared unpreparedness yet dreaded equally the other alternative under discussion—the compulsory military service plan.

Postponement would serve to make the draft more acceptable. Some would vote for a draft after Jan. 1, just as many a man will purchase an expensive article on ninety days credit who would refuse to consider paying cash down for it.

Passage of the bill would probably have been expedited by some compromise that would have appeal for both viewpoints, such as a provision for immediate registration, but delay in calling for service.

If the registration were given a more agreeable name—call it, say, an informative survey or enumeration—even more obstacles might be ironed out. And if this enumeration were also made the occasion for individuals to register their opinions and preferences regarding war, defense, and type of service desired, even some of the sternest opponents might rush to be counted in.

Science News Letter, September 7, 1940

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Additional Reviews
On Page 160

ZOOLOGY

ANIMALS IN ACTION—Gayle Pickwell—*Whittlesey House*, 190 p., 68 plates, \$4. Those who are already acquainted with Gayle Pickwell's three books, *Weather*, *Deserts*, and *Birds*, will know what a treat awaits them here. Those who have not yet had the good fortune to know them have a surprise as well as a treat in store. While it is probably true that the majority of Pickwell's followers were attracted first by his superb photographic illustrations, there is nevertheless much sound meat in the accompanying text.

Science News Letter, September 7, 1940

ZOOLOGY

ANIMALS NOBODY KNOWS—Ivan T. Sanderson—*Viking*, 77 p., illus., \$2. Do you know what a picchicago is? a hemigale? a gerenuk? a three-toed echidna? a pig-footed bandicoot? These and a lot of other wholly incredible mammals are described and beautifully figured (with full-page illustrations) in a book that will be a delight to anyone even a little interested in natural history.

Science News Letter, September 7, 1940

BIOLOGY

ADAPTIVE COLORATION IN ANIMALS—Hugh B. Cott—*Oxford Univ.*, 508 p., 48 plates, 84 text illus., \$8.50. Ever since Darwin, special attention has been focussed on the often astonishing resemblance between animals and leaves, twigs, bark and other objects, with a great deal of "learned argument, about it and about." Here, a Cambridge University zoologist presents his doctrine, in text and illustration, with a thoroughness worthy of Darwin himself.

Science News Letter, September 7, 1940

NATURAL HISTORY

EXPLORING THE EARTH AND ITS LIFE IN A NATURAL HISTORY MUSEUM (rev. ed.)—James Lindsay McCreery—*Stokes*, 312 p., illus., \$2.50. Museums are intended to interpret the earth and its life; but they have become so bewilderingly huge and complex that they are themselves in need of interpretation. It is well that this book is kept abreast of museum progress.

Science News Letter, September 7, 1940

HORTICULTURE

TEXTBOOK OF GENERAL HORTICULTURE—Julian Claude Schilletter and Harry Wyatt Richey—*McGraw-Hill*, 367 p., illus., \$3. A new college textbook in horticulture, not too bulky yet complete

and comprehensive. Small-scale as well as large-scale enterprises receive due attention, and the relation of horticulture to soil, climate and other ecological factors seems distinctly promising from the teacher's point of view.

Science News Letter, September 7, 1940

HORTICULTURE

THE GARDEN CLINIC; CARE AND CULTIVATION OF GARDEN FAVORITES—Laurence Blair—*Macmillan*, 144 p., illus., \$2. How to make a garden, and (what is more important still) what to do when things go wrong. Numerous double-page layouts of annotated illustrations, giving condensed information about ornamentals, their treatment and cultivation, their ailments and enemies, constitute a unique and valuable feature.

Science News Letter, September 7, 1940

TECHNOLOGY

TRANSACTIONS OF THE AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Vol. 136; Petroleum Development and Technology, 1940—*Amer. Inst. of Mining and Metallurgical Engineers*, 608 p., illus., tables, \$5. This volume, the fifteenth of the Petroleum Development and Technology series of the Petroleum Division of the A. I. M. M. E., contains papers presented before recent meetings of the division. The five chapters are devoted to Production Engineering, Engineering Research, Petroleum Economics, Foreign and Domestic Production and Refining.

Science News Letter, September 7, 1940

TECHNOLOGY

CHAMBERS'S TECHNICAL DICTIONARY—C. F. Tweney and L. E. C. Hughes, eds.—*Macmillan*, 957 p., \$5. In the preface it is stated that this "is a dictionary of technical terms, written by specialists, partly for other specialists but more particularly for the technically minded man-in-the-street, and for students and interested workers of all kinds and ages; indeed, for all who wish to understand what scientists and engineers have to say to each other." This aim seems to be well-fulfilled.

Science News Letter, September 7, 1940

GENERAL SCIENCE

TOMORROW'S HORIZONS, A DIAGNOSTIC READING IMPROVEMENT PROGRAM, BOOK B—Lydia A. Thomas and Daisy Grenzow—*American Education Press*, 96 p., 36c.

Science News Letter, September 7, 1940

GEOLOGY

THE ROCK BOOK—Carroll Lane Fenton and Mildred Adams Fenton—*Doubleday, Doran*, 357 p., illus., \$6. A well written, superbly illustrated book about minerals and rocks, with the geological background needed to make mineralogy and petrology really understandable. (See also page 155.)

Science News Letter, September 7, 1940

GEOGRAPHY—HISTORY

THE PACIFIC OCEAN—Felix Riesenberger—*Whittlesey House*, 322 p., illus., \$3. Episodes in the history of the Pacific Ocean, from Magellan and Drake to the opening of Japan and the settlement of Alaska. This book will make especially interesting reading at the present time, when history is apparently ripe for another period of rapid development in the Pacific area.

Science News Letter, September 7, 1940

NAVAL WARFARE

GERMAN SUBS IN YANKEE WATERS: FIRST WORLD WAR—Henry J. James, Illus. by Charles E. Pont—*Gotham House*, 208 p., illus., \$3. Exploits of German submarines off the United States coast during the first World War, including the planting of mines one of which sank the cruiser *San Diego*.

Science News Letter, September 7, 1940

GENERAL SCIENCE

THE ADVANCEMENT OF SCIENCE, No. 4, July, 1940—*British Association for the Advancement of Science*, 113 p., 5 s. The record continued, of the Dundee meeting, interrupted by the beginning of the war.

Science News Letter, September 7, 1940

BIOLOGY

UNRESTING CELLS—R. W. Gerard—*Harper*, 439 p., \$3.75. (See page 147.)

Science News Letter, September 7, 1940

ECONOMICS

WHAT WILL INFLATION AND DEVALUATION MEAN TO YOU?—Donald G. Ferguson, Bion H. Francis and others—*Amer. Inst. for Economic Research*, 144 p., \$1. Intended for the layman.

Science News Letter, September 7, 1940

SOCIOLOGY

TRAFFIC IN OPIUM AND OTHER DANGEROUS DRUGS FOR THE YEAR ENDED DECEMBER, 1939—*Govt. Print. Off.*, 116 p., 20c. A report of the U. S. Bureau of Narcotics.

Science News Letter, September 7, 1940

*First Glances at New Books

RADIO

NATIONAL POLICY FOR RADIO BROADCASTING—C. B. Rose, Jr.—*Harper*, 289 p., \$3. In this study by a committee of the National Economic and Social Planning Association, the main aspects of the broadcasting problem are defined, including discussions of the technical and commercial structure, program content, freedom of the air, relations with the press, etc. Elements of a future national policy are suggested, one being that the networks, rather than individual stations, should be the basis of American broadcasting. "If radio broadcasting is to remain a private industry," it concludes, "it must be operated as a public trust."

Science News Letter, September 7, 1940

TELEVISION

TELEVISION BROADCASTING, Production, Economics, Technique—Lenox R. Lohr—*McGraw-Hill*, 274 p., \$3. By reading this interesting and carefully written book by the president of the Chicago Museum of Science and Industry and former president of the National Broadcasting Co., one can appreciate the many problems which, for some 13 years, have kept television from getting around that corner. Particularly of note is the complete script, with all cues, of a television play, Conan Doyle's "The Three Garidebs," as presented by the N. B. C.

Science News Letter, September 7, 1940

RADIO

FM, AN INTRODUCTION TO FREQUENCY MODULATION—John F. Rider—*Rider Publisher*, 136 p., illus., \$1. Soon the problems of the radio service man will be increased by the new sets that will come into use as frequency modulation spreads among the broadcasters. In this book he will find many of the answers.

Science News Letter, September 7, 1940

ENGINEERING

LESSONS IN ARC WELDING—*Lincoln Electric Co.*, 136 p., illus., 50c. In these 51 lessons are covered the elements of the arc welding process in a very practical manner. The book is used as the text at the Lincoln Arc Welding School, whose course of 120 hours is given in a four weeks term.

Science News Letter, September 7, 1940

AERONAUTICS

AIRPOWER—Al Williams—*Coward-McCann*, 433 p., \$3.50. An experienced flier, well known for his frank expression of opinion, here tells some of his

views concerning airpower as demonstrated in Europe, and how it affects the United States.

Science News Letter, September 7, 1940

AERONAUTICS

AMERICAN AVIATION DIRECTORY, Aviation Officials and Companies, U. S. and Canada (Vol. 1, No. 1)—Wayne W. Parrish, ed.; David Shawe, ass't. ed.—234 p., \$5 subscription (two editions); \$3 single copy. Including manufacturers of aircraft, parts, and equipment; air lines; organizations and schools, as well as government departments, this directory will surely prove of great value to anyone concerned with aviation. By issuing two editions per year, the publishers will be able to keep it up to date, in a rapidly developing field.

Science News Letter, September 7, 1940

ECONOMICS—WAR

M DAY AND WHAT IT MEANS TO YOU—Leo M. Cherne—*Simon and Schuster*, 103 p., \$1. Information on what will happen to individuals, businesses, etc. when and if war comes, provided it does not sneak up behind us as it seems to be doing; in which case the title might well be M Year.

Science News Letter, September 7, 1940

GENERAL SCIENCE

INVITATION TO EXPERIMENT—Ira M. Freeman—*Dutton*, 238 p., illus., \$2.50. A course in physics outside the classroom so simplified that the interested layman can read and do the tricks to bring him some understanding of the physical world.

Science News Letter, September 7, 1940

GENERAL SCIENCE

OUR WORLD CHANGES—Samuel Ralph Powers, Elsie Flint Neuner, Herbert Bascom Bruner and John Hodgdon Bradley—*Ginn*, 565 p., illus., \$1.52. Interesting, intelligent and comprehensive introduction to science and the world around us for grade eight use. Second in a series of three texts by the same authors, covering successive years.

Science News Letter, September 7, 1940

CHEMISTRY

AN INTRODUCTION TO ORGANIC CHEMISTRY (2d ed.)—Ira D. Garard—*Wiley*, 389 p., \$3. The first edition of this excellent text for a one semester introductory course was issued in 1932. In bringing out the second, Dr. Garard has been able to include new material, and, in some cases, to simplify the procedure.

Science News Letter, September 7, 1940

PHYSICS

WHAT MAKES THE WHEELS GO ROUND; A First-time Physics—Edward G. Huey—*Reynal and Hitchcock*, 175 p., illus., \$2.50. To the elementary school child, of ten or eleven years, this book should be a most fascinating introduction to physical science. The author has tested it in his own classes at the Calvert School in Baltimore, but it will also be of interest to scientifically-minded youngsters to read outside of their classes.

Science News Letter, September 7, 1940

HOBBIES

MAKING MODELS OF FAMOUS SHIPS—Ray J. Marran—*Appleton-Century*, 151 p., illus., \$2. A book to delight boys and their elders who are handy with scroll-saw and pocket knife and who have a longing for things of the sea.

Science News Letter, September 7, 1940

ANTHROPOLOGY—JUVENILE

LITTLE JUNGLE VILLAGE—JoBesse McElveen Waldeck; Illus. by Katharina von Dombrowski—*Viking Press*, 176 p., illus., \$2. Adventures of two little Indians, an eleven-year-old boy and his sister aged nine, who left their village to start a village of their own in the South American jungle. The youthful pioneers meet jungle problems with Tarzan's courage and resourcefulness.

Science News Letter, September 7, 1940

ANTHROPOLOGY

PASCUA, A YAQUI VILLAGE IN ARIZONA—Edward H. Spicer—*Univ. of Chicago*, 319 p., illus., maps, \$3.50. Analyzes patterns of life in a village which joins modern economic conditions—such as cotton-picking jobs—with the ceremonial system of Indian forefathers. Dr. Spicer spent a year at this village on the outskirts of Tucson, to study, as in a laboratory, social changes in progress.

Science News Letter, September 7, 1940

AGRICULTURE

AN EMPIRE OF DUST—Lawrence Svoboda—*Caxton Printers*, 203 p., illus., \$3. The author relates his own personal experiences as a wheat farmer during the Years of Dust. He concludes: "My own humble opinion is that, with the exception of a few favored localities, the whole Great Plains region is already a desert that cannot be reclaimed through the plans and labors of man."

Science News Letter, September 7, 1940